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STATE CAPITOL, AT TOPEKA.
In this building the Kansas Academy of Science rooms are located.

TRANSACTIONS

OF THE

KANSAS

ACADEMY OF SCIENCE.

VOL. XIX.

EDITED BY THE SECRETARY,
G. P. GRIMSLEY.

CONTAINS

LIST OF OFFICERS, PAST AND PRESENT; MEMBERSHIP LIST JANUARY 10, 1905; HISTORICAL SKETCH OF THE ACADEMY; CONSTITUTION AND BY-LAWS; MINUTES OF THE THIRTY-SIXTH AND THIRTY-SEVENTH ANNUAL MEETINGS; AND SOME PAPERS READ.

TOPEKA, KANSAS:
GEO. A. CLARK, STATE PRINTER.
1905.

OFFICERS OF THE ACADEMY, 1905.

President.....L. C. WOOSTER.....Emporia.
Vice-president.....F. W. BUSHONG.....Kansas City, Kan.
Vice-president.....W. A. HARSHBARGER.....Topeka.
Treasurer.....ALVA J. SMITH.....Emporia.
Secretary.....J. T. LOVEWELL.....Topeka.

Past Officers of the Academy.

PRESIDENTS.

1869, '70.... B. F. Mudge.
1871-'73.... John Fraser.
1874-'78.... F. H. Snow.
1879, '80.... B. F. Mudge.
1881, '82.... J. T. Lovewell.
1883..... A. H. Thompson.
1884, '85.... R. J. Brown.
1886..... E. L. Nichols.
1887..... J. D. Parker.
1888..... J. R. Mead.
1889..... T. H. Dinsmore, jr.
1890..... G. H. Failyer.
1891..... Robert Hay.
1892..... E. A. Popenoe.
1893..... E. H. S. Bailey.
1894..... L. E. Sayre.
1895..... Warren Knaus.
1896..... D. S. Kelly.
1897..... S. W. Williston.
1898..... D. E. Lantz.
1899..... E. B. Knerr.
1900..... A. S. Hitchcock.
1901..... E. Miller.
1902..... J. T. Willard.
1903..... J. C. Cooper.
1904..... Edward Bartow.

VICE-PRESIDENTS.

1869, '70.... J. S. Whitman.
1871..... B. F. Mudge.
1872, '73.... B. F. Mudge, Dr. R. J. Brown.
1874..... J. A. Banfield, J. D. Parker.
1875..... B. F. Mudge, J. D. Parker.
1876, '77.... B. F. Mudge.
1878..... B. F. Mudge, J. H. Carruth.
1879-'82.... J. H. Carruth, Joseph Savage.
1883..... J. R. Mead, G. E. Patrick.
1884..... F. H. Snow, Joseph Savage.
1885..... E. L. Nichols, G. H. Failyer.
1886..... J. D. Parker, N. S. Goss.
1887..... J. R. Mead, E. H. S. Bailey.
1888..... E. H. S. Bailey, T. H. Dinsmore, jr.
1889..... E. H. S. Bailey, G. H. Failyer.
1890..... D. S. Kelly, F. W. Cragin.
1891..... F. W. Cragin, O. C. Charlton.
1892..... F. O. Marvin, Mrs. N. S. Kedzie.
1893..... J. T. Willard, E. B. Knerr.
1894..... I. D. Graham, J. D. Hewitt.
1895..... I. D. Graham, S. W. Williston.
1896..... S. W. Williston, D. E. Lantz.
1897..... D. E. Lantz, A. S. Hitchcock.
1898..... C. S. Parmenter, L. C. Wooster.
1899..... A. S. Hitchcock, J. R. Mead,
1900..... E. Miller, J. C. Cooper.
1901..... J. C. Cooper, L. C. Wooster.
1902..... Edward Bartow, J. A. Yates.
1903..... Edward Bartow, J. A. Yates.
1904..... L. C. Wooster, B. F. Eyer.

SECRETARIES.

1869-'73.... J. D. Parker.
1874, '75.... John Wherrell.
1876, '77.... Joseph Savage.
1878-'89.... E. A. Popenoe.
1890-'92.... E. H. S. Bailey.
1893..... A. M. Collette.
1894-'98.... E. B. Knerr.
1899-1901... D. E. Lantz.
1902-'04.... G. P. Grimsley.

TREASURERS.

869-'73.... F. H. Snow.
1873-'75.... R. J. Brown.
1876, '77.... W. K. Kedzie.
1878-'83.... R. J. Brown.
1884, '85.... A. H. Thompson.
1886-'90.... I. D. Graham.
1891..... F. O. Marvin.
1892-'95.... D. S. Kelly.
1896..... L. E. Sayre.
1897-1900... J. W. Beede.
1901, '02.... E. C. Franklin.
1903..... Alva J. Smith.

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MEMBERSHIP OF THE ACADEMY

January 10, 1905.

HONORARY MEMBERS.

G. P. Grimsley, Ph. D., 1904, assistant state geologist.... Morgantown, W. Va.
Rev. Johns D. Parker, 1897 ..... New Haven, Conn.
Arnold B. Johnson, 1897, United States Lighthouse Board, Washington, D. C.
W. A. Kellerman, Ph. D., 1897, Ohio State University.... Columbus, Ohio.
Edw. L. Nichols, Ph. D., 1897, Cornell University..... Ithaca, N. Y.
W. S. Franklin, Sc. D., 1897, Lehigh University ..... South Bethlehem, Pa.
George Wagner, Phar. C., 1904, University of Wisconsin.. Madison, Wis.
S. W. Williston, Ph. D., 1902, University of Chicago..... Chicago, Ill.

ASSOCIATE MEMBERS.

Mrs. R. J. Brown, 1903..... Leavenworth.
Mrs. Mary Savage, 1897..... Lawrence.

LIFE MEMBERS.

Dates printed in the following list signify date of election to membership in the Academy.

E. H. S. Bailey, Ph. D., 1883, University of Kansas..... Lawrence.
F. W. Cragin, M. S., 1880..... Colorado Springs.
L. L. Dyche, M. S., 1881, University of Kansas..... Lawrence.
Geo. H. Failyer, Ph. D., 1879, Department of Agriculture.. Washington, D. C.
E. C. Franklin, Ph. D., 1884, Leland Stanford Jr. University ..... Stanford Univ., Cal.
I. D. Graham, 1879, *Kansas Farmer*..... Topeka.
Erasmus Haworth, Ph. D., 1882, University of Kansas.... Lawrence.
Warren Knaus, M. S., editor McPherson *Democrat*..... McPherson.
D. E. Lantz, M. S., 1887, biological survey..... Washington, D. C.
J. T. Lovewell, Ph. D., 1878, secretary Academy of Science, Topeka.
F. O. Marvin, C. E., 1884, University of Kansas..... Lawrence.
J. R. Mead, 1879..... Wichita.
Ephraim Miller, Ph. D., 1873, University of Kansas..... Lawrence.
E. A. Popence, A. M., 1872, Kansas Agricultural College, Manhattan.
L. E. Sayre, Ph. M., 1885, University of Kansas..... Lawrence.
B. B. Smyth, 1880, curator of Goss ornithological collection, Topeka.
F. H. Snow, Ph. D., 1868, University of Kansas..... Lawrence.
A. H. Thompson, D. D. S., 1873..... Topeka.
D. M. Valentine, LL. D., 1878..... Topeka.
M. L. Ward, D. D., 1880, Ottawa University..... Ottawa.
J. T. Willard, M. S., 1883, Kansas Agricultural College... Manhattan.
S. W. Williston, Ph. D., 1880, University of Chicago..... Chicago, Ill.

ANNUAL MEMBERS.

L. O. Adams, 1903, University of Kansas ..... Lawrence.
Orr Adams, 1898..... Telluride, Colo.
H. C. Allen, 1904 ..... McPherson.
John J. Arthur, 1904..... Topeka.
W. R. Arthur. B. A., 1903, high school ..... Logan.

ANNUAL MEMBERS.

C. H. Ashton, 1903, University of Kansas..... Lawrence.
Alfred W. Ayers, 1904, minister Congregational church... Onaga.
Harvey W. Baker, 1902, Kansas Agricultural College..... Manhattan.
M. A. Barber, 1904, University of Kansas..... Lawrence.
Elam Bartholomew, M. S., 1895..... Stockton.
Edward Bartow, Ph. D., 1897, University of Kansas..... Lawrence.
Wm. C. Bauer, A. M., 1897, Baker University..... Baldwin.
W. J. Baumgartner, 1904, University of Kansas..... Lawrence.
Frank G. Bedell, 1904..... Iola.
J. W. Beede, Ph. D., 1894, University of Indiana..... Bloomington, Ind.
Edw. Bumgardner, M. D., 1896..... Lawrence.
F. W. Bushong, B. S., 1896, Kansas City University..... Kansas City, Kan.
H. P. Cady, 1904, University of Kansas..... Lawrence.
M. E. Canty, 1903..... Buffalo.
Clarence L. Cole, M. D., 1902..... Washington, D. C.
Ewing N. Collett, 1903, Indian University..... Bacone, I. T.
Rev. John T. Copley, 1903..... Clinton.
J. C. Cooper, 1899..... Topeka.
W. R. Crane, 1904, University of Kansas..... Lawrence.
Ralph K. Crawford, 1904, University of Kansas..... Lawrence.
F. F. Crevecœur, 1899..... Onaga.
Robert W. Curtis, Ph. D., 1904, University of Kansas.... Lawrence.
F. B. Dains, Ph. D., 1902, Washburn College..... Topeka.
R. E. Davis, 1904..... Fort Scott.
Geo. A. Dean, 1903, Kansas Agricultural College..... Manhattan.
S. D. Dice, 1904, public schools..... Alma.
James Dickson, 1904, University of Kansas..... Lawrence.
Hugo Diemer, M. E., 1903, University of Kansas..... Lawrence.
R. B. Dunlevy, B. S., 1896, Southwest Kansas College.... Winfield.
Harry Eagle, 1905..... Topeka.
J. Whit Ebey, 1903, science teacher..... Howard.
H. W. Emerson, 1904, University of Kansas..... Lawrence.
H. W. Ewing, D. D. S., 1903, Iola Gas Company..... Iola.
B. F. Eyer, B. S., 1894, Kansas Agricultural College..... Manhattan.
Fred Faragher, 1904..... Lawrence.
A. O. Garrett, 1901, high school..... Salt Lake City, Utah.
Chas. N. Gould, B. S., 1903, University of Oklahoma..... Norman, Okla.
C. F. Gustafson, 1899, University of Kansas..... Lawrence.
Brice E. Hammars, 1904, chemist Santa Fe shops..... Topeka.
J. O. Hamilton, 1903, Kansas Agricultural College..... Manhattan.
Dr. Eva Harding, 1904..... Topeka.
H. J. Harnly, B. S., 1893, McPherson College..... McPherson.
W. A. Harshbarger, B. S., 1902, Washburn College..... Topeka.
L. D. Havenhill, 1904, University of Kansas..... Lawrence.
H. D. Hess, 1904, University of Kansas..... Lawrence.
W. E. Henderson, 1901..... Iola.
W. C. Hoad, 1904, University of Kansas..... Lawrence.
Geo. J. Hood, 1904, University of Kansas..... Lawrence.
Geo. W. Hoxie, M. D., 1902, University of Kansas..... Lawrence.
W. F. Hoyt, A. M., 1902, Kansas Wesleyan University... Salina.
Albert K. Hubbard, 1904, University of Kansas..... Lawrence.

ANNUAL MEMBERS.

Thos. M. Iden, 1897, State Normal School ..... Emporia.
F. B. Isely, B. S., 1902, high school ..... Wichita.
John J. Jewett, 1902 ..... San Diego, Cal.
Carl Johns, 1900, Bethany College ..... Lindsborg.
A. W. Jones, B. S., 1894, Kansas Wesleyan University ... Salina.
Hugo Kahl, 1897, Carnegie Museum ..... Pittsburg, Pa.
George F. Kay, 1904, State University ..... Lawrence.
W. H. Keller, 1898, high school ..... Hays City.
Harry L. Kent, 1904, high school ..... Hays City.
John H. Klopfer, 1904 ..... Topeka.
E. B. Knerr, Sc. D., 1889 ..... Atchison.
Rev. James G. Knotter, 1903 ..... Dexter.
Pierce Larkin, 1902, University of Oklahoma ..... Norman, Okla.
B. E. Lewis, 1904, city schools ..... Eureka.
Miss Hester E. Loveall, 1904, manual-training school ..... Pittsburg.
H. T. Martin, 1902, University of Kansas ..... Lawrence.
R. Matthews, D. D. S., 1898 ..... Wichita.
Walter E. Matthewson, 1903, Kansas Agricultural College, Manhattan.
F. M. McClenahan, 1903, Kansas Agricultural College .... Manhattan.
E. C. McClung, 1903, University of Kansas ..... Lawrence.
Elmer V. McCollum, 1902, University of Kansas ..... Lawrence.
Edith A. McIntyre, B. S., 1902 ..... Middletown, N. Y.
D. F. McFarland, 1903, University of Kansas ..... Lawrence.
J. M. McWharf, M. D., 1902 ..... Ottawa.
W. G. Medcraft, 1904, Kansas Wesleyan University ..... Salina.
Grace R. Meeker, 1899, high school ..... Ottawa.
C. F. Menninger, M. D., 1903 ..... Topeka.
H. L. Miller, 1904, high school ..... Topeka.
Roy L. Moodie, 1904, University of Kansas ..... Lawrence.
L. N. Morscher, 1900, high school ..... Lawrence.
Travis Morse, 1903 ..... Iola.
J. H. Newby, 1899, photographer ..... Osage City.
A. M. Nissen, A. M., 1888, high school ..... Wetmore.
D. H. Otis, M. S., 1897 ..... Oswego.
W. K. Palmer, M. E., 1897, consulting engineer ..... Kansas City, Mo.
Frank Patrick, 1903 ..... Topeka.
Leslie F. Paull, 1903, manual-training school ..... Kansas City, Mo.
L. M. Peace, 1904, University of Kansas ..... Lawrence.
Norman Plass, D. D., 1902, president of Washburn College, Topeka.
S. F. Poole, B. S., 1902, Fairmount College ..... Wichita.
Charles H. Popenoe, 1903, Kansas Agricultural College ... Manhattan.
J. M. Price, A. M., 1900 ..... Atchison.
C. S. Prosser, M. S., 1892, Ohio State University ..... Columbus, Ohio.
W. S. Prout, 1904 ..... Topeka.
Albert B. Reagan, 1904, Indian School ..... Rosebud, S. Dak.
W. F. Rice, 1902, public schools ..... Marion.
A. P. Reudiger, 1905 ..... Lawrence.
Lumina C. Riddle, M. S., 1902 ..... Columbus, Ohio.
Arthur Ringer, 1902, county high school ..... Effingham.
D. C. Schaffner, 1903, College of Emporia ..... Emporia.
J. H. Schaffner, A. M., M. S., 1902, Ohio State University, Columbus, Ohio.

ANNUAL MEMBERS.

Theo. H. Scheffer, 1903, Kansas Agricultural College..... Manhattan.
Eva Schley, 1903, high school..... Topeka.
Aaron Schuyler, 1904, Kansas Wesleyan University..... Salina.
C. H. Shattuck, 1899, Washburn College..... Topeka.
Roscoe H. Shaw, 1904, Kansas Agricultural College..... Manhattan.
J. L. Shearer, 1902, public schools..... Halstead.
E. T. Shelley, M. D., 1892..... Atchison.
J. A. G. Shirk, 1904, University of Kansas..... Lawrence.
Alva J. Smith, 1893, county surveyor..... Emporia.
Eugene G. Smyth, 1901..... Topeka.
Wesley N. Speckman, Ph. D., 1903, Kansas Wesleyan University..... Salina.
B. T. Stauber, D. D., 1903..... Salina.
S. G. Stewart, M. D., 1904..... Topeka.
Chas. M. Sterling, 1904, University of Kansas..... Lawrence.
Chas. H. Sternberg, 1895..... Lawrence.
Teresa Stevenson, 1901..... Ottawa.
W. C. Stevens, 1904, University of Kansas..... Lawrence.
E. F. Stimpson, University of Kansas..... Lawrence.
A. J. Stout, 1904, high school..... Topeka.
R. S. Sherwin, 1901..... Norman, Okla.
Olin Templin, 1904..... Lawrence.
A. M. Ten Eyck, 1903, Kansas Agricultural College..... Manhattan.
F. J. Titt, B. S., 1898, Kingfisher College..... Kingfisher, Okla.
E. S. Tucker, 1904, University of Kansas..... Lawrence.
J. D. Walters, M. S., 1894, Kansas Agricultural College.. Manhattan.
C. D. Weaver, M. D., 1902..... McPherson.
Ella Weeks, 1903, Kansas Agricultural College..... Manhattan.
J. E. Welin, 1899, Bethany College..... Lindsborg.
W. B. Wilson, 1903, Ottawa University..... Ottawa.
L. B. Wishard, 1903, high school..... Iola.
C. H. Withington, 1903, Kansas Agricultural College.... Manhattan.
H. I. Woods, M. S., 1902, Washburn College..... Topeka.
L. C. Wooster, 1897, State Normal School..... Emporia.
J. A. Yates, M. S., 1898, Ottawa University..... Ottawa.

Total number of members, 172.

NOTE.—The following names should have been printed in the list at top of page 21, viz.: M. A. Barber, Lawrence; W. C. Hoad, Lawrence; L. D. Havenhill, Lawrence; H. L. Miller, Topeka; W. C. Stevens, Lawrence; C. M. Sterling, Lawrence; H. L. Kent, Hays City; J. H. Klopper, Topeka; John A. Arthur, Topeka.

ADDRESSES DELIVERED AND PAPERS READ

BEFORE THE

KANSAS ACADEMY OF SCIENCE,

AT

MANHATTAN, 1903,

TOPEKA, 1904.

I.—Presidential Addresses.

II.—Chemical and Physical Papers.

III.—Geological Papers.

IV.—Biological Papers.

V.—Miscellaneous Papers.

VI.—Necrology.

VII.—Announcements, Library Accession List, and Index.

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"OXYGEN IN ITS RELATION TO MINERALOGY."
By J. C. COOPER, Topeka, Kan.

"WATER SUPPLIES OF SOUTHEASTERN KANSAS."
By PROF. EDWARD BARTOW, of the University of Kansas, Lawrence.

II.

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By D. F. McFarland, University of Kansas, Lawrence.

"Native Zinc."
By J. T. Willard, Kansas State Agricultural College, Manhattan.

"Progress in the Production of High-protein Corn."
By J. T. Willard and R. H. Shaw, Kansas State Agricultural College, Manhattan.

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By L. D. Havenhill, University of Kansas, Lawrence.

"A New Derivative of Diazo-amido-benzene."
By Edward Bartow and H. C. Allen, University of Kansas, Lawrence.

"The Action of Ethyl Chlorsulfonate upon Aniline."
By F. W. Bushong, Kansas City University, Kansas City, Kan.

"Reactions in Liquid Ammonia."
By Edward Curtis Franklin, Leland Stanford Jr. University, California.

"Properties and Composition of Some Typical Flours."
By W. E. Matthewson, Kansas State Agricultural College, Manhattan.

"An Autographic Recording Instrument for Tension Tests."
By Geo. J. Hood, University of Kansas, Lawrence.

"The Effect of Clay and Loam on the Strengh of Portland Cement Mortar."
By W. C. Hoad, University of Kansas, Lawrence.

"Notes on Some Kansas Paving Brick."
By F. O. Marvin, University of Kansas, Lawrence."

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"Coal-mining in Atchison County."
By E. B. Knerr, Atchison.

"A Fossil Forest in Jackson County."
By C. H. Shattuck, Washburn College, Topeka.

"Origin of Gypsum, with Special Reference to the Origin of the Michigan Deposits."
By G. P. Grimsley, Assistant State Geologist, Morgantown, W. Va.

"Some Notes on Kansas Geology."
By L. C. Wooster, Kansas State Normal School, Emporia.

"The Fauna of the Mentor."
By Alfred W. Jones, Kansas Wesleyan University, Salina.

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ANNOUNCEMENTS.

Since our last volume of the Transactions was issued, two years ago, 100 new annual members have been elected, a gain of 100 per cent. in the two years. The Academy has been enriched by the addition of the mineral exhibits from the St. Louis fair, giving us one of the finest museums of the mineral industries in the state. State support in form of a salary for the secretary has been given in this time. The Academy is in a flourishing condition, and membership in the Society should be looked upon as an honor. The work, however, should not stop with this progress; each member should feel it a duty and privilege to work for the success of this Academy. This can be done by bringing in names for new members and preparing papers for the meetings. At the last meeting over sixty papers were presented, and the meeting was one of the most successful yet held.

In accordance with a resolution passed by the Academy, members will please send their photographs to the office. Seventy-five have been collected.

Papers presented at the Academy meetings, especially those intended for publication in the Transactions, should be typewritten carefully before being filed for publication.

With this volume my work as secretary of the Kansas Academy of Science ends, through a combination of interests which calls me to West Virginia. The work has been a pleasant one, and it is with some feeling of regret that I lay down this work. I wish in this public way to express my appreciation of the honors conferred on me by the Academy at the session just closed. If my work during the past three years has resulted in good to this society and has added to its progress, it has been due to the ready response of the members to suggestions sent out from this office and to their active cooperation.

The next meeting of the Academy will be held in Lawrence, near the close of 1905.

TOPEKA, KAN., January, 1905.

G. P. Grimsley